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Your reference **Docking(UK)**

The **Patent Office**

Request for grant of a Patent

Form 1/77

Patents Act 1977

1 Title of invention

Dock for a portable navigation device

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4 Reference Number

Docking (UK)

5 Claiming an earlier application date

An earlier filing date is claimed:

Yes ☐ No ☒

Number of earlier application or patent number

Filing date

15 (4) (Divisional) ☐ 8(3) ☐ 12(6) ☐ 37(4) ☐

6 Declaration of priority

Country of filing	Priority Application Number	Filing Date

7 Inventorship	
The applicant(s) are the sole inventors/joint inventors	
Yes ☐	No ☒

8 Checklist

		Continuation sheets	
Claims	1	Description	20
Abstract	1	Drawings	6 x 6

8

Priority Documents	~~Yes~~/No
Translations of Priority Documents	~~Yes~~/No
Patents Form 7/77	~~Yes~~/No
Patents Form 9/77	Yes/~~No~~
Patents Form 10/77	Yes/~~No~~

9 Request

We request the grant of a patent on the basis of this application

Signed: Origin Limited Date: 15 March 2004

(Origin Limited)

DOCK FOR A PORTABLE NAVIGATION DEVICE

BACKGROUND OF THE INVENTION

1. Field of the invention

This invention relates to a dock (i.e. docking station) for a portable navigation device. The navigation device can display travel information and finds particular application as an in-car navigation system.

2. Description of the prior art

GPS based navigation devices are well known and are widely employed as in-car navigation devices. Reference may be made to the Navigator series software from the present assignee, TomTom B.V. This is software that, when running on a PDA (such as a Compaq iPaq) connected to an external GPS receiver, enables a user to input to the PDA a start and destination address. The software then calculates the best route between the two end-points and displays instructions on how to navigate that route. By using the positional information derived from the GPS receiver, the software can determine at regular intervals the position of the PDA (typically mounted on the dashboard of a vehicle) and can display the current position of the vehicle on a map and display (and speak) appropriate navigation instructions (e.g. 'turn left in 100 m'). Graphics depicting the actions to be accomplished (e.g. a left arrow indicating a left turn ahead) can be displayed in a status bar and also be superimposed over the applicable junctions/turnings etc in the roads shown in the map itself. Reference may also be made to devices that integrate a GPS receiver into a computing device programmed with a map database and that can generate navigation instructions on a display. These integrated devices are often mounted on or in the dashboard of a vehicle. The term 'navigation device' refers to a device that enables a user to navigate to a pre-defined destination. The device may have an internal system for receiving location data, such as a GPS receiver, or may merely be connectable to a receiver that can receive location data.

The device is a portable device and hence has to be securely mounted onto a dock that is itself firmly attached to the dashboard or windscreen, usually with a suction cup.

The device may be connected to an external aerial to pick up GPS signals. The RF signals from the external aerial (mounted on the roof or on the dashboard but with better external visibility, i.e. line of sight to GPS satellites) are routed along a co-axial cable that has to be plugged directly into the navigation device. This means that, to use an external aerial, a user has to first dock the device and then connect the RF cable to the device. This can be inconvenient.

SUMMARY OF THE INVENTION

In a first aspect, there is a dock for a portable navigation device, in which the device is programmable with map data and a navigation application that enables a route to be planned between two user-defined places, wherein the dock comprises a RF connector designed to automatically interface with a RF connector in the device in order to feed RF signals from an external aerial to the device when the device is correctly mounted on the dock.

The RF signals are typically GPS signals. As noted earlier, RF signals from an external aerial are conventionally routed along a co-axial cable that is plugged directly into the navigation device. This means that a user has to first dock the device and then hook up the RF cable. This can be inconvenient. But with the present invention, a user merely has to dock the navigation device onto the platform for an automatic connection to any external aerial connected to the dock to be made. There is no need to laboriously plug in a RF cable directly into the navigation device.

The dock may comprise a platform that is rotatably mounted on an arm, the device being removably attached to the platform. The arm itself may then be pivotally mounted so that the platform can be moved vertically and horizontally.

Docking the device onto the platform is very straightforward; the user merely has to move the device so that its base engages a lip on the platform; the user then rolls the device backwards, rotating it about the region where base and lip are touching. The lip is shaped to guide the device into correct alignment and engagement with the dock. The device then sits firmly on the platform, with the RF connectors on platform and device in good contact.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described with reference to the accompanying drawings, in which **Figure 1** is a screen shot from a navigation device; the screen shot shows a plan map view and a status bar running along the bottom of the display;

Figure 2 is a screen shot from the navigation device implementing a 3-D view;

Figure 3 is a screen shot from the navigation device showing a navigation menu;

Figures 4A and 4B are perspective views of the navigation device and dock according to the present invention; and

Figure 5 is a schematic view of the system architecture for the navigation device;

Figure 6 is a schematic view of the navigation device, dock and external GSP aeral.

DETAILED DESCRIPTION

System Overview

The present invention is a dock for a navigation device from TomTom B.V. called Go. Go deploys navigation software called Navigator and has an internal GPS recevier; Navigator software can also run on a touch screen (i.e. stylus controlled) Pocket PC powered PDA device, such as the Compaq iPaq. It then provides a GPS based navigation system when the PDA is coupled with a GPS receiver. The combined PDA and GPS receiver system is designed to be used as an in-vehicle navigation system.

The invention may also be used for any other arrangement of navigation device, such as one with an integral GPS receiver/computer/display, or a device designed for non-vehicle use (e.g. for walkers) or vehicles other than cars (e.g. aircraft). The navigation device may implement any kind of position sensing technology and is not limited to GPS; it can hence be implemented using other kinds of GNSS (global navigation satellite system) such as the European Galileo system. Equally, it is not limited to satellite based location/velocity systems but can equally be deployed using ground-based beacons or any other kind of system that enables the device to determine its geographic location.

Navigator software, when running on a PDA, results in a navigation device that causes the normal navigation mode screen shown in **Figure 1** to be displayed. This view provides driving instructions using a combination of text, symbols, voice guidance and a moving map. Key user interface elements are the following: a 2-D map **1** occupies most of the screen. The map shows the user's car and its immediate surroundings, rotated in such a way that the direction in which the car is moving is always "up". Running across the bottom quarter of the screen is the status bar **2**. The current location of the device, as the device itself determines using conventional GPS location finding and its orientation (as inferred from its direction of travel) is depicted by an arrow **3**. The route calculated by the device (using route calculation algorithms stored in device memory as applied to map data stored in a map database in device memory) is shown as darkened path **4** superimposed with arrows giving the travel direction. On the darkened path **4**, all major actions (e.g. turning corners, crossroads, roundabouts etc.) are schematically depicted by arrows **5** overlaying the path **4**. The status bar **2** also includes

at its left hand side a schematic **6** depicting the next action (here, a right turn). The status bar **2** also shows the distance to the next action (i.e. the right turn – here the distance is 220 meters) as extracted from a database of the entire route calculated by the device (i.e. a list of all roads and related actions defining the route to be taken). Status bar **2** also shows the name of the current road **8**, the estimated time before arrival **9** (here 2 minutes and 40 seconds), the actual estimated arrival time **10** (11.36am) and the distance to the destination **11** (1.4Km). The GPS signal strength is shown in a mobile-phone style signal strength indicator **12**.

If the user touches the centre of the screen **13**, then a navigation screen menu is displayed; from this menu, other core navigation functions within the Navigator application can be initiated or controlled. Allowing core navigation functions to be selected from a menu screen that is itself very readily called up (e.g. one step away from the map display to the menu screen) greatly simplifies the user interaction and makes it faster and easier.

The area of the touch zone which needs to be touched by a user is far larger than in most stylus based touch screen systems. It is designed to be large enough to be reliably selected by a single finger without special accuracy; i.e. to mimic the real-life conditions for a driver when controlling a vehicle; he or she will have little time to look at a highly detailed screen with small control icons, and still less time to accurately press one of those small control icons. Hence, using a very large touch screen area associated with a given soft key (or hidden soft key, as in the centre of the screen **13**) is a deliberate design feature of this implementation. Unlike other stylus based applications, this design feature is consistently deployed throughout Navigator to select core functions that are likely to be needed by a driver whilst actually driving. Hence, whenever the user is given the choice of selecting on-screen icons (e.g. control icons, or keys of a virtual keyboard to enter a destination address, for example), then the design of those icons/keys is kept simple and the associated touch screen zones is expanded to such a size that each icon/key can unambiguously be finger selected. In practice, the associated touch screen zone will be of the order of at least 0.7 cm^2 and will typically be a square zone. In normal navigation mode, the device displays a map. Touching the map (i.e. the touch sensitive display) once (or twice in a different implementation) near to the screen centre (or any part of the screen in another implementation) will then call up a navigation menu (see

cking

Figure 3) with large icons corresponding to various navigation functions, such as the option to calculate an alternative route, and re-calculate the route so as to avoid the next section of road (useful when faced with an obstruction or heavy congestion); or recalculate the route so as to avoid specific, listed roads.

The actual physical structure of the device is fundamentally different from a conventional embedded device in terms of the memory architecture (see System Architecture section below). At a high level it is similar though: memory stores the route calculation algorithms, map database and user interface software; a microprocessor interprets and processes user input (e.g. using a device touch screen to input the start and destination addresses and all other control inputs) and deploys the route calculation algorithms to calculate the optimal route. 'Optimal' may refer to criteria such as shortest time or shortest distance, or some other user-related factors.

More specifically, the user inputs his start position and required destination in the normal manner into the Navigator software running on the PDA using a virtual keyboard. The user then selects the manner in which a travel route is calculated: various modes are offered, such as a 'fast' mode that calculates the route very rapidly, but the route might not be the shortest; a 'full' mode that looks at all possible routes and locates the shortest, but takes longer to calculate etc. Other options are possible, with a user defining a route that is scenic – e.g. passes the most POI (points of interest) marked as views of outstanding beauty, or passes the most POIs of possible interest to children or uses the fewest junctions etc.

Roads themselves are described in the map database that is part of Navigator (or is otherwise accessed by it) running on the PDA as lines – i.e. vectors (e.g. start point, end point, direction for a road, with an entire road being made up of many hundreds of such sections, each uniquely defined by start point/end point direction parameters). A map is then a set of such road vectors, plus points of interest (POIs), plus road names, plus other geographic features like park boundaries, river boundaries etc, all of which are defined in terms of vectors. All map features (e.g. road vectors, POIs etc.) are defined in a co-ordinate system that corresponds or relates to the GPS co-ordinate system, enabling a device's position as determined through a GPS system to be located onto the relevant road shown in a map.

Route calculation uses complex algorithms that are part of the Navigator software. The algorithms are applied to score large numbers of potential different routes. The Navigator software then evaluates them against the user defined criteria (or device defaults), such as a full mode scan, with scenic route, past museums, and no speed camera. The route which best meets the defined criteria is then calculated by a processor in the PDA and then stored in a database in RAM as a sequence of vectors, road names and actions to be done at vector end-points (e.g. corresponding to pre-determined distances along each road of the route, such as after 100 meters, turn left into street x).

Figures 4A and **4B** are perspective views of an actual implementation of a navigation device and dock. The navigation device is a unit **41** that includes display, internal GPS receiver, microprocessor, power supply and memory systems. The device **41** sits on a docking platform **45**; the platform **45** is rotatably mounted an arm **42** that can pivot horizontally about bolt post **46**. The arm **42** can also pivot vertically about posts **47**, which pass through apertures in a mounting arm which has a large suction cup **43** at one end. As shown in **Figure 4B**, the device **41** and docking platform **45** can rotate together; this combined with the vertical and horizontal degrees of movement allowed by posts **46** and **47** enables the device, when secured to the car dashboard using a large suction cup **43**, to be perfectly positioned for a driver.

One important detail of the design is that, whilst the device **41** includes an internal GPS receiver with an internal aerial, in some circumstances it is desirable to use an external GPS aerial (e.g. roof mounted). Normally, an external aerial would connect to a navigation device using a co-axial cable with a socket that plugs directly into the navigation device. But with the present system, the co-axial cable is fed directly to a RF aerial socket **44**, positioned on the docking platform **45**. When the navigation device is mounted correctly on the docking platform **45**, a RF connector internal to the device **41** engages the aerial socket **44** to feed RF signals from the external aerial to the device circuitry. If the driver rotates the device, then the device maintains engagement with the aerial socket **44** since socket **44** is part of the docking platform **45**.

System Architecture

In contrast to conventional embedded devices which execute all the OS and application code in place from a large mask ROM or Flash device, an implementation of the present invention uses a new memory architecture. **Figure 5** schematically depicts the device. The device, indicated generally at **51**, includes conventional items such as a microprocessor **56**, power source **57**, display and related rivers **58**. In addition, it includes a SD card reader **53**; a SD card **52** is shown slotted into position. The device **51** has internal DRAM **54** and XIP Flash **55** and.

The device hence uses three different forms of memory:

1. A small amount of internal XIP (eXecute In Place) Flash ROM **55**. This is analogous to the PC's BIOS ROM and will only contain a proprietary boot loader, E^2 emulation (for UID and manufacturing data) and splash screen bit maps. This is estimated to be 256 KB in size and would be on a slow 8 bit wide SRAM interface.
2. The main system RAM (or DRAM) memory **54**, this is analogous to the PC's main memory (RAM). This will be where all the main code executes from as well as providing the video RAM and workspace for the OS and applications. **Note:** No persistent user data will be stored in the main system RAM (like a PC) i.e. there will be no "Ram drive". This RAM will be exclusively connected to a 32bit 100MHz synchronous high-speed bus.
3. Non-volatile storage, analogous to the PC's hard disk. This is implemented as removable NAND flash based SD cards **52**. These devices do not support XIP. All the OS, application, settings files and map data will be permanently stored on SD cards

On boot up the proprietary boot loader **55** will prompt for the user to insert the supplied SD card **52**. When this is done, the device will copy a special system file from the SD card **52** into RAM **54**. This file will contain the Operating System and navigation application. Once this is complete control will be passed to the application. The application then starts and access non-volatile data e.g. maps from the SD card **52**.

When the device is subsequently switched off, the RAM **54** contents is preserved so this boot up procedure only occurs the first time the device is used.

Device **51** also includes a GPS receiver with integral antenna; a RF connector **59** for taking in a RF signal from an external aerial is also provided. This is shown schematically in **Figure 6**: the navigation device **61** is mounted on docking platform **62**; as noted earlier, docking platform **62** includes a RF connector **63** that engages with the RF connector in the device **61** to pass RF signals from GPS satellites to the device **61**. An external aerial **65** is connected via co-axial RF cable **64** to the connector on the platform **63**. In this way, a user merely has to dock the navigation device onto the platform for an automatic connection to any external aerial to be made. There is no need to laboriously plug in a RF cable directly into the navigation device.

The following other signals are also connected via the dock to the navigation device:

1. Power from the vehicle
2. A signal to automatically mute the car audio system during a spoken command
3. A signal to switch on and off the device automatically with the vehicles ignition switch or key
4. Audio output signals to play spoken commands on the vehicles audio system.

Appendix 1

GO product specification

Introduction

Go is a stand-alone fully integrated personal navigation device. It will operate independently from any connection to the vehicle.

Target markets

Go is indented to address the general personal navigation market. In particular it is designed to extend the market for personal navigation beyond the "early adopter" market. As such it is a complete stand-alone solution; it does not require access to a PC, PDA or Internet connection. The emphasis will be on completeness and ease of use. Although Go is a complete personal navigation solution it is primarily intended for in vehicle use. The primary target market is anybody who drives a vehicle either for business or pleasure.

To successfully address this market Go must satisfy the following top-level requirements:

1. Acceptable price point - Appropriate compromise between product features and cost.
2. Simplicity – Installation and operation of Go will be simple and intuitive, all major functions should be accomplished by an average non PC-literate user without recourse to the product manual.
3. Flexibility – All map data and operating programs will be supplied on plug in memory cards. The device can easily be extended to cover different locals.
4. Reliability – Although in-car navigation systems are not considered safety critical components users will come to rely on Go. It will be engineered to all relevant automotive environmental standards. In addition it will be tolerant to short GPS coverage outages.

Channels

- Consumer electronics retail outlets
- Automotive accessory outlets
- Specialist car accessory fitting garages

Product summary

Go is an in-vehicle personal navigation device. It is designed as an appliance, that is, for a specific function rather than a general purpose one. It is designed for the consumer after-

sales automotive market. It will be simple to use and install by the end user, although a professional fitting kit will be optionally supplied.

The principal features are:

- Built on standard commodity PocketPC 2002 components
-
- Standard PocketPC 3.5" _VGA transflective TFT LCD display mounted in landscape orientation
- Romless soft-boot memory architecture
- Highly integrated ARM9 200MHz CPU
- SD card memory slot for application and map data storage
- Integrated GPS receiver and antenna
- Integrated two axis accelerometer for simple dead reckoning
- Power, audio, debug and external GPS antenna connections made through docking connector on base of unit
- Embedded Linux OS with no GUI layer, application provides its own UI
- Very simple touch screen UI optimised for finger use
- High quality integrated speaker for voice instructions
- Internal rechargeable Li-Ion battery giving at least five hours of continuous operation

Operating System

Go will use a customised version of embedded Linux. This will be loaded from an SD card by a custom boot-loader program which resides in Flash memory

Hard buttons

Go will have only one hard button, the power button. It is pressed once to turn on or off Go. The UI will be designed so that all other operations are easily accessible through the pen based UI.

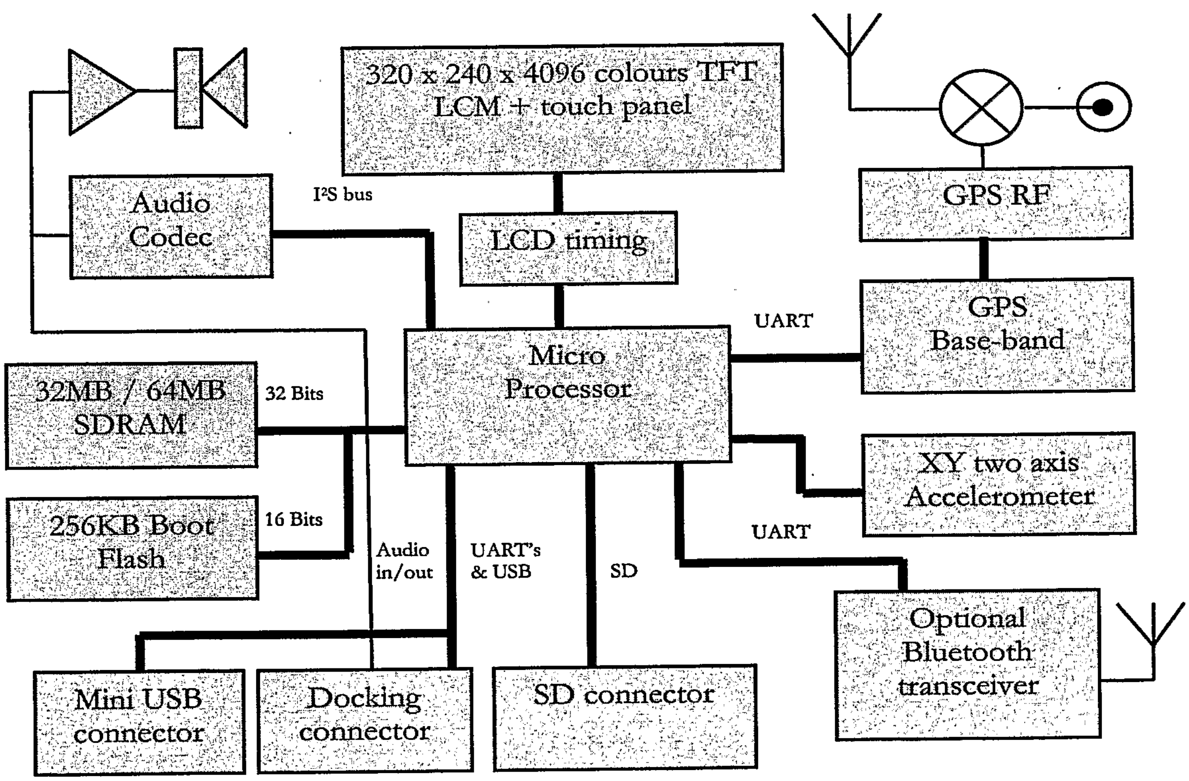
There will also be a concealed hard reset button.

Architecture

Go architecture is based around a highly integrated single chip processor designed for mobile computing devices. This device delivers approximately 200 MIPs of performance from an industry standard ARM920T processor. It also contains all the peripherals required excluding the GPS base-band. These peripherals include DRAM controller, timer/counters, UARTs, SD interface and LCD controller.

The main elements of this architecture are:

- Microprocessor running at 200MHz
- 32MB or 64MB of fast synchronous DRAM (SDRAM) with low power self refresh. Arranged as two devices on a 32 bit wide 100MHz bus
- SD card interface for all non-volatile storage including the OS (No RAM drive)
- Native (bare metal) boot loader stored in 256KB of NOR Flash. This Flash device will contain a boot sector which is write protected to store protected data such as unique product ID's and manufacturing data.
- Debug UART (RS232 3V levels) connected to the docking connector
- USB client for PC connectivity
- Integrated GPS receiver
- Integrated two axis accelerometer
- Optional integrated Bluetooth transceiver for PDA and mobile phone connectivity
- High quality audio through I^2S codec and amplifier



Go block diagram

Power management

Go will be powered from an integrated Li-Ion 2200 mAH rechargeable battery. This battery can be charged, and the device powered (even if the battery contains no charge) from an externally supplied +5V power source. This external +5V power source is supplied via the docking connector or a DC jack socket.

This +5V supply will be generated from the vehicle's main supply rail or from a mains adapter externally. The device will be turned on and off by a single button. When the device is turned off the DRAM contents will be preserved by placing the RAM in self-refresh so that when switched on Go will resume from where it was switched off. There will also be a wake-up signal available through he docking connector, this can be used to auto-switch on Go when the vehicle ignition is switched on.

There will also be a small hidden reset switch.

System Memory architecture

In contrast to conventional embedded devices which execute all the OS and application code in place from a large mask ROM or Flash device, Go will be based on a new memory architecture which is much closer to a PC.

This will be made up of three forms of memory:

4. A small amount of XIP (eXecute In Place) Flash ROM. This is analogous to the PC's BIOS ROM and will only contain a proprietary boot loader, E^2 emulation (for UID and manufacturing data) and splash screen bit maps. This is estimated to be 256 KB in size and would be on a slow 8 bit wide SRAM interface.
5. The main system memory, this is analogous to the PC's main memory (RAM). This will be where all the main code executes from as well as providing the video RAM and workspace for the OS and applications. **Note:** No persistent user data will be stored in the main system RAM (like a PC) i.e. there will be no "Ram drive". This RAM will be exclusively connected to a 32bit 100MHz synchronous high-speed bus. Go will contain two sites for 16 bit wide 256/512Mbit SDRAM's allowing memory configurations of 32MB (16 bit wide) 64MB 32 bit wide and 128 MB (32 bit wide).
6. Non-volatile storage, analogous to the PC's hard disk. This is implemented as removable NAND flash based SD cards. These devices do not support XIP. All the OS, application, settings files and map data will be permanently stored on SD cards

Audio

A 52 mm diameter speaker is housed in Go to give good quality spoken instructions. This will be driven by an internal amplifier and audio codec. Audio line out will also be present on the docking connector..

SD Memory slot

Go will contain one standard SD card socket. These are used to load system software and to access map data.

Display

Go will use a transflective 3.5" TFT backlit display It will be a 'standard' _VGA display as used by PocketPC PDA's. It will also contain a touch panel and bright CCFL backlight.

Power supplies

Power supply – AC adapter socket

4.75V to 5.25V (5.00V +/- 5%) @ 2A

Power supply – Docking connector

4.75V to 5.25V (5.00V +/- 5%) @ 2A

Variants

It shall be possible to assemble and test the following variants of Go:

Standard (Bluetooth depopulated, 32Mbyte RAM)

In the Standard variant the Bluetooth function is not populated, and 32 Mbytes RAM is fitted.

Bluetooth option (Future variant)

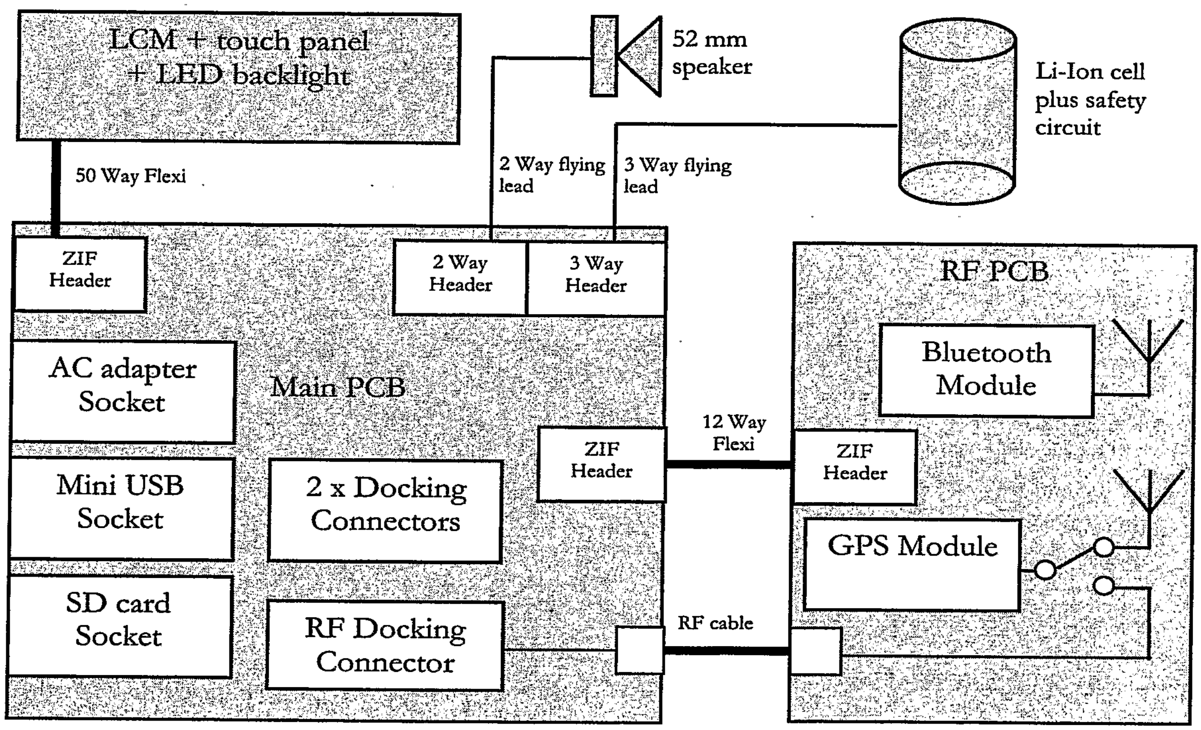
The product design should include Bluetooth although it is not populated in the standard variant to minimise BOM cost. The design should ensure that all other functions (including GPS RF performance) operate without degradation when the Bluetooth function is operating.

64Mbyte RAM option (Future variant)

The product design should ensure it is possible to fit 64Mbyte RAM instead of 32Mbyte.

Subassemblies

Go consists of the following electrical subassemblies:



RF cable

The RF cable feeds the RF signal from an external GPS antenna (which connects to Go via the RF docking connector) to the RF PCB where the GPS module is situated.

External connectors

Docking Connectors

Two Docking Connectors provide an interface to external Docking Stations.

Docking Connector #1 pinout

Pin	Signal	Dir	Type	Description
1	GND	-	-	Signal and power GND
2	GND	-	-	
3	DOCKSNS1	I/P	PU	Docking Station Sense [0,1] – These signals are connected to pull-up resistors within the unit. The Docking Station pulls either or both of these signals to GND to indicate the presence and type of Docking Station.
4	DOCKSNS0	I/P	PU	
5	AUDIOL	O/P		Audio line outputs (Left and Right) to connect to car audio system.
6	AUDIOR	O/P		
7	MUTE	O/P	O/D	The unit pulls this line to GND to signal the car audio system to mute itself while the unit is issuing a voice command.
8	IGNITION	I/P	PD	Ignition sense.
9	DOCKPWR	I/P	PWR	+5V power from the Docking Station to simultaneously power the unit and charge the battery.
10	DOCKPWR	I/P	PWR	

PWR	Power connection	PU	Pull-Up resistor within the unit
O/D	Open-Drain output	PD	Pull-Down resistor within the unit

Docking Connector #2 pinout

Pin	Signal	Dir	Type	Description
1	TXD	O/P	UART	3V logic level UART signals
2	RXD	I/P	UART	
3	RTS	O/P	UART	
4	CTS	I/P	UART	
5	GND	-	PWR	
6	nTRST	I/P	JTAG	CPU JTAG signals for test and configuration
7	TMS	I/P	JTAG	
8	TCK	I/P	JTAG	
9	TDI	I/P	JTAG	
10	TDO	O/P	JTAG	

RF Docking Connector

The RF Docking Connector allows connection of an external active GPS antenna via a Docking Station.

AC adapter socket

The AC adapter socket allows power to be supplied from a low cost AC adapter or CLA (Cigarette Lighter Adapter).

USB connector

The USB connector allows connection to a PC by means of a standard mini USB cable.

SD card socket

A hard locking SD card socket suitable for high vibration applications supports SDIO, SD memory and MMC cards.

(Although Go provides hardware support for SDIO, software support will not be available at the time of product introduction)

Processor

The processor is the ARM920T based SOC (System on chip) operating at approx 200Mhz.

RAM

Go will be fitted with RAM to the following specification:

Type	SDRAM with low-power refresh ("mobile" SDRAM)
Total memory	32 Mbyte (standard) or 64 Mbyte (future option)
Bus width	32-bit
Minimum speed	100Mhz
Maximum self refresh current	500 _A per device
Configuration	2 x 16-bit wide CSP sites

Flash Memory

Go will be fitted with a minimum of 256kbyte of 16-bit wide Flash Memory to contain the following:

- Boot loader code to enable loading of O/S from SD card
- Factory set read-only protected manufacturing parameters (e.g. manufactured date) and unique ID (E2PROM emulation)
- User specific settings (E2PROM emulation)

The following devices can be used depending on price and availability.:

GPS internal antenna

The GPS internal antenna is attached directly to the RF PCB.

GPS external (active) antenna switching

When an external antenna is connected via the RF Docking Connector, the GPS antenna source is automatically switched to the external antenna.

Accelerometer

A solid state accelerometer is connected directly to the processor to provide information about change of speed and direction.

Auxiliary functions

Ignition synchronization

Ignition wakeup

A rising edge on the Docking Station IGNITION signal will wakeup the unit. The IGNITION signal may be connected to a 12V or 24V vehicle battery.

Ignition state monitoring

The state of the Docking Station IGNITION signal is detected and fed to a GPIO pin to allow software to turn off the unit when the ignition signal goes low.

Standard peripherals

The following peripherals will be included as standard with Go.

- Simple docking shoe. Mounts Go and allows charging through a DC jack. No other connectivity is included in the simple dock.
- Cigarette lighter power cable connecting to Go through the DC jack socket or simple docking shoe.
- Mini USB cable for PC connectivity
- Universal mains adapter for connection to DC Jack socket

Optional peripherals

The following optional peripherals will be available at or after the time of launch of Go

- Active antenna kit. Contains a GPS active antenna and a docking shoe with GPS RF connector and cable fitted. For self installation when an external antenna is required.
- Professional vehicle docking kit. For fitting by professional installation only. Allows direct connection to vehicle supply, audio system and active antenna via a vehicle interface box.

CLAIMS

1. A dock for a portable navigation device, in which the device is programmable with map data and a navigation application that enables a route to be planned between two user-defined places, wherein the dock comprises a RF connector designed to automatically interface with a RF connector in the device in order to feed RF signals from an external aerial to the device when the device is correctly mounted on the dock.

2. The dock of Claim 1 wherein the RF signals are GPS signals.

3. The dock of Claim 1 or 2 comprising a platform that is rotatably mounted on an arm, the device being removably attached to the platform.

4. The dock of Claim 3 in which the arm is pivotally mounted so that the platform can be moved vertically and horizontally.

5. The dock of any preceding claim comprising a lip about which the device is designed to rotate when being mounted onto the dock, the lip being shaped to guide the device into correct alignment and engagement with the dock.

6. The dock of any preceding Claim when mounted on a vehicle dashboard or windscreen.

Abstract

DOCK FOR A PORTABLE NAVIGATION DEVICE

A dock for a portable navigation device comprises a RF connector designed to automatically interface with a RF connector in the device in order to feed GPS RF signals from an external aerial to the device when the device is correctly mounted on the dock. RF signals from an external aerial are conventionally routed along a co-axial cable that is plugged directly into the navigation device. This means that a user has to first dock the device and then hook up the RF cable. But with the present invention, a user merely has to dock the navigation device onto the platform for an automatic connection to any external aerial connected to the dock to be made. There is no need to laboriously plug in a RF cable directly into the navigation device.

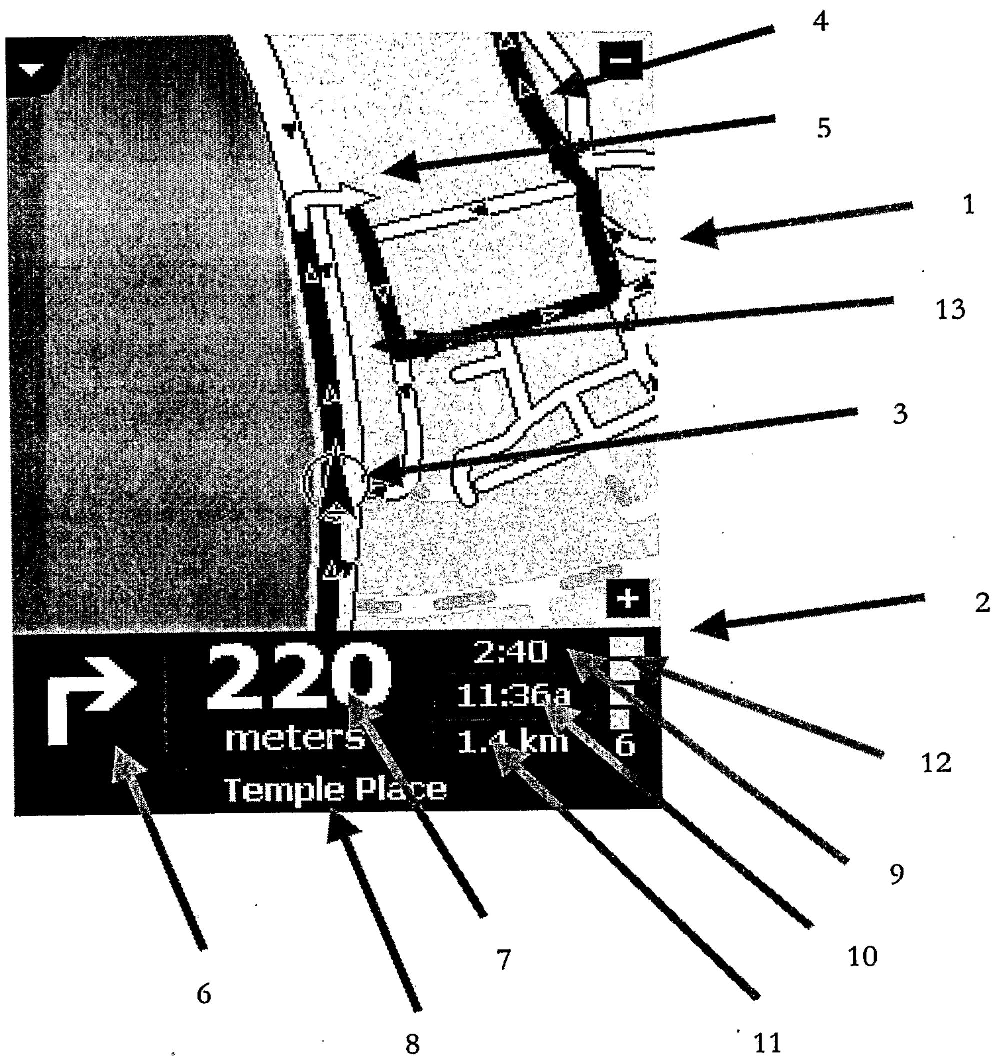

4
5
1
13
3
2
220
meters
Temple Place
2:40
11:36a
1.4 km
6
12
9
10
11
7
6
8

Figure 1

Figure 2

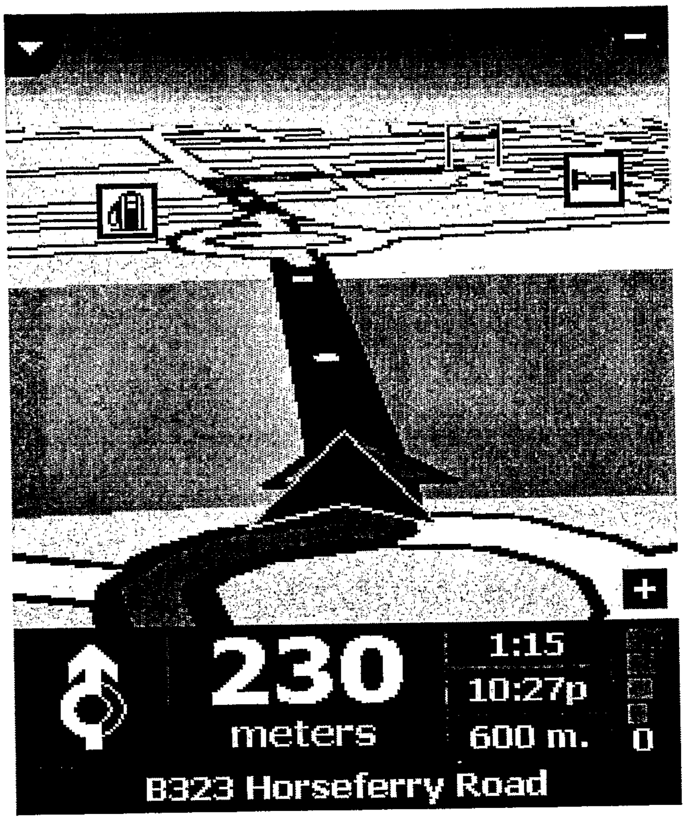


Figure 3

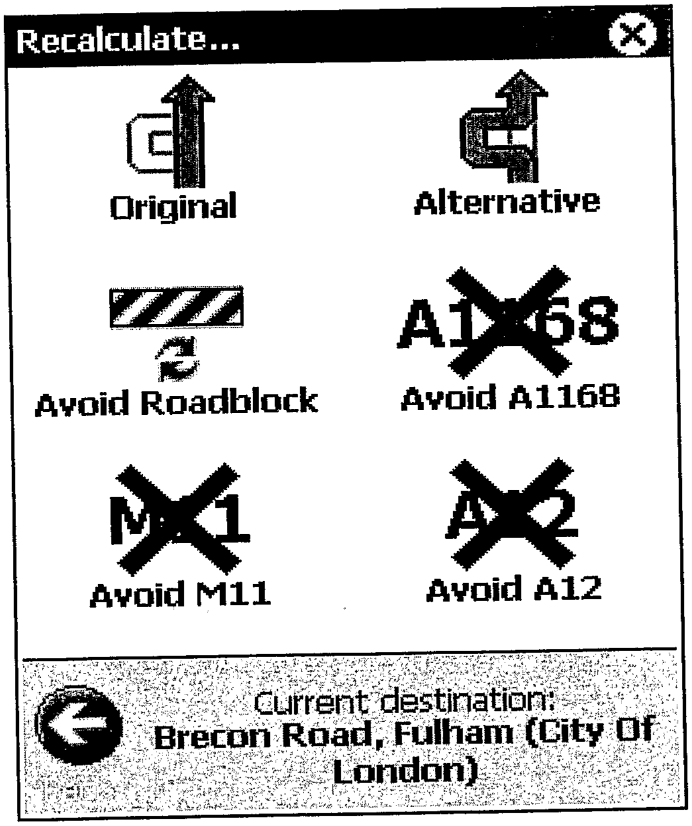

Recalculate...
Original
Alternative
Avoid Roadblock
A1168
Avoid A1168
M11
Avoid M11
A12
Avoid A12
Current destination:
Brecon Road, Fulham (City Of London)

Figure 4A

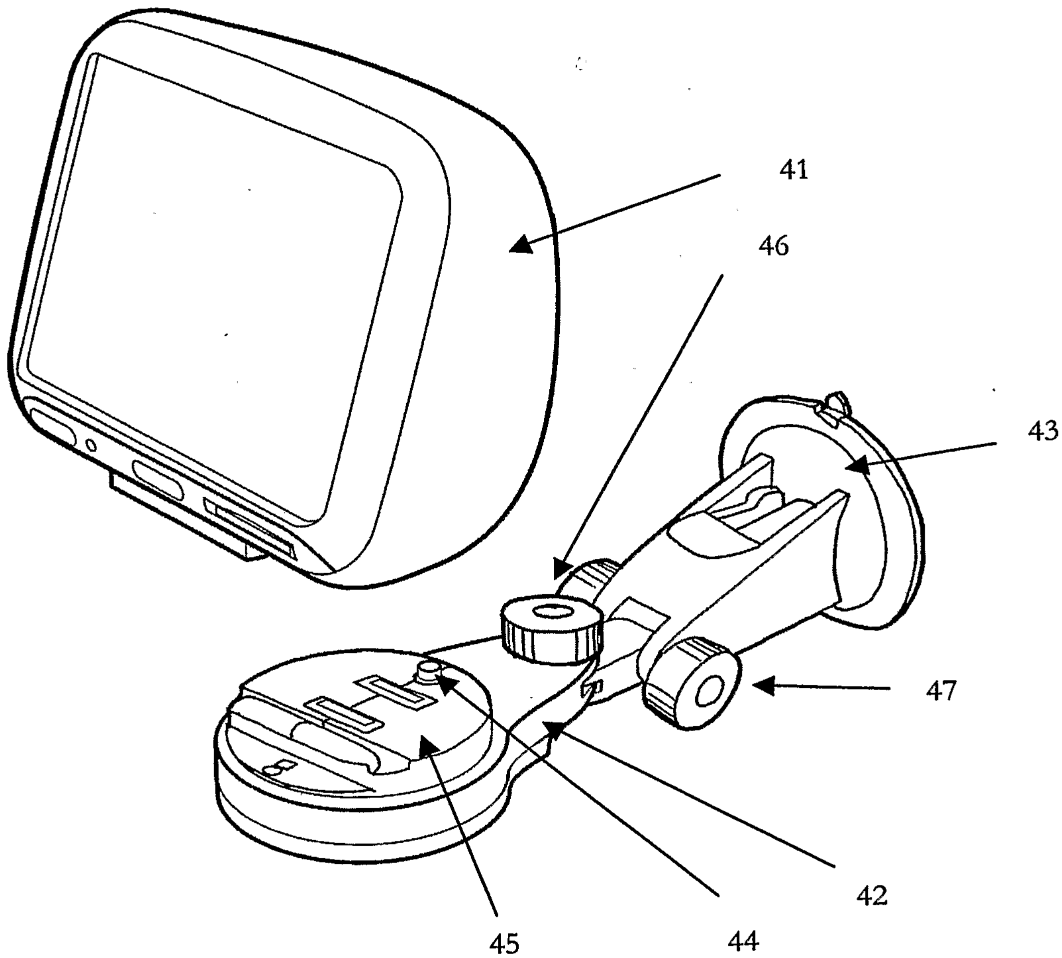


Figure 4B

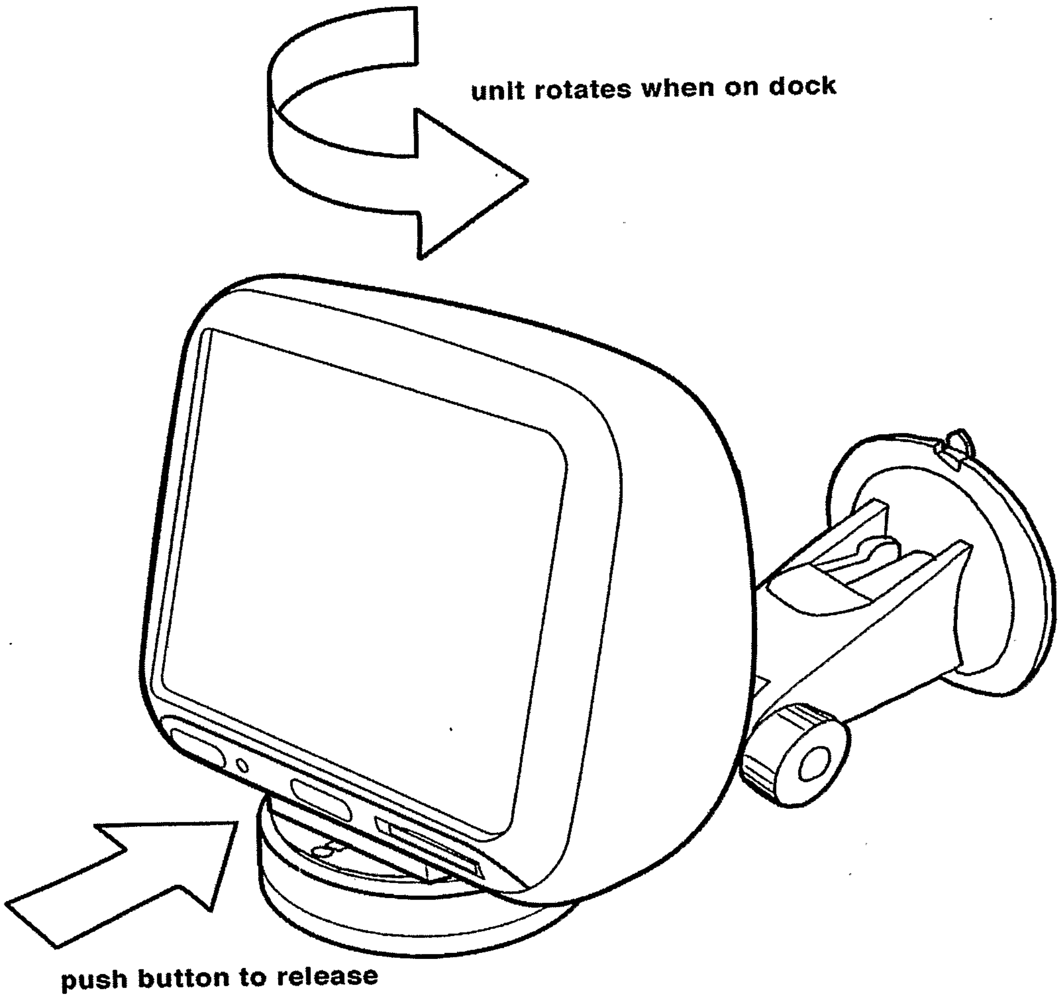


Figure 5

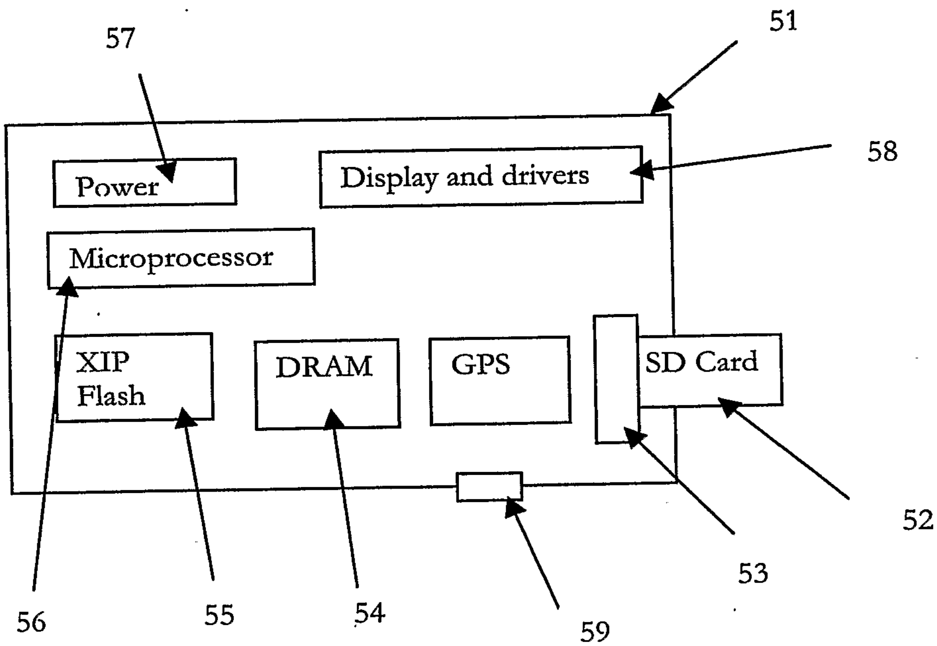


Figure 6